

<b>2000-148728/14</b> A35 E24 F06 <b>CIBA 1998.07.08</b> <b>CIBA SPECIALTY CHEM HOLDING INC</b> *DE 19930995-A1 1998.07.08 1998-001456(+1998CH-001456) (2000.01.13) D06P 1/18, 1/24 <b>Ink-jet printing on textile, especially cellulose, e.g. cotton or viscose rayon</b> <b>C2000-046796</b> Addnl. Data: MHEIDLE M, KOLLER S 1999.07.05 1999DE-1030995	A(3-A5A, 8-E3, 11-C4A, 12-S5Q) E(21-C10, 21-C13, 21-C16, 21-D, 21-D1, 21-D3, 22-C, 22-C1, 22-C2, 22-C3, 22-E1, 23-B, 25, 25-E1) F(3-F3, 3-F9, 3-F16A, 3-F16C, 3-F18, 3-F19, 3-F22, 3-F25, 3-F31) wool, silk, polyvinyl, polyacrylonitrile, polyamide, aramid, polypropylene, polyester and polyurethane materials, including cellulose 2½- and tri-acetate, polyethylene terephthalate or polyethylene terephthalate-co-isophthalate and condensation products of iso- or tere-phthalic acid with 1,4-bis(hydroxymethyl)-cyclohexane.
<b>NOVELTY</b> Ink-jet printing on textiles uses an aqueous ink containing reactive, disperse or pigment dye(s) with a viscosity of 1-40 mPa.s. <b>USE</b> The process is used for printing a textile web in one nuance over the entire area, especially for printing both sides at the same time; or for printing a textile with a digitalized image with a computer-controlled ink-jet printer (all claimed), including digitalized images from a video camera or scanner. It is especially useful for printing textiles containing hydroxyl groups, preferably natural and regenerated cellulose, e.g. linen, hemp, lyocell and especially viscose and cotton, or mixtures containing these. It can also be used with	<b>ADVANTAGE</b> Ink-jet printing is much cheaper and quicker than screen printing. The inks have good stability and viscosity. They give strongly colored prints with sharp contours and good general fastness (e.g. to acids, alkalis, water, washing, sea water, over-dyeing, perspiration, chlorine, rubbing, ironing and pleating). <b>WIDER DISCLOSURE</b> The reactive, disperse or pigment dyes used are known or can be prepared by methods analogous to those for known dyes, e.g. diazotization, coupling, addition and condensation reactions.

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**SPECIFIC COMPOUNDS**

Specific examples of the disperse dyes are 1-(2-phenylaminocarbonyloxyethyl)-2,2,4,7-tetramethyl-6-(2,2-dicyanoethenyl)-1,2,3,4-tetrahydroquinoline (VII) and 3-hydroxy-2-(1,3-dioxo-indanylidene)-quinoline (VIII) of the formulae;

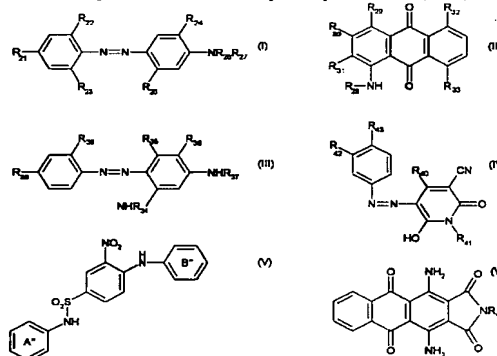
**EXAMPLE**

Mercerized cotton satin with padded with a liquor containing 40 g/l sodium carbonate and 100 g/l urea (70% pickup) and dried. It was then printed with a drop-on-demand piezo ink-jet head, using an ink containing 15 wt.% of the reactive dye 8-(2-N-ethyl-N-phenylamino)-4-chloro-1,3,5-triazin-6-yl-amino-2-(2-sulfophenylazo)-1-hydroxynaphthalene-3,6-disulfonic acid, 20 wt.% 1,2-propylene glycol and 65 wt.% water. The print was dried completely and fixed for 8 minutes at 102 °C in saturated steam, then given a cold rinse and boiling wash, rinsed again and dried. The resultant print had excellent general fastness.

**TECHNOLOGY FOCUS**

Organic Chemistry - Preferred Disperse Dyes: The disperse dye is an azobenzene (I), aminoanthraquinone (II), 2,6-diamino-3-phenylazo-

pyridine (III), 3-phenylazo-5-cyano-2-hydroxypyrid-6-one (IV), 2-phenylamino-5-phenylaminosulfonyl-nitrobenzene (V), 1,3,5,10-tetraoxo-naphth[3-j]isoidole (VI) or 1-(2-phenylaminocarbonyloxyethyl)-2,2,4,7-tetramethyl-6-(2,2-dicyanoethenyl)-1,2,3,4-tetrahydroquinoline (VII) of the formulae;



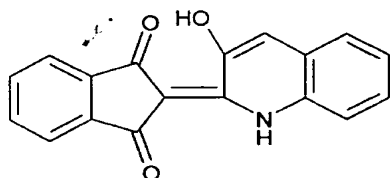
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R<sub>21</sub>, R<sub>38</sub> = halogen, nitro (NO<sub>2</sub>) or cyano (CN);  
 R<sub>22</sub>, R<sub>39</sub> = hydrogen (H), halogen, NO<sub>2</sub> or CN;  
 R<sub>23</sub> = halogen or CN;  
 R<sub>24</sub> = H, halogen, 1-4 carbon (C) alkyl or 1-4 C alkoxy;  
 R<sub>25</sub> = H, halogen or acylamino;  
 R<sub>26</sub>, R<sub>27</sub> = 1-4 C alkyl, optionally substituted by hydroxyl (OH), acetoxy or phenoxy;  
 R<sub>28</sub> = H, phenyl or phenylsulfoxy, in which the phenyl ring may be substituted by 1-4 C alkyl or 1-4 C alkylsulfo;  
 R<sub>29</sub> = amino or OH; R<sub>30</sub> = H or 1-4 C alkoxy;  
 R<sub>31</sub> = H or -O-C<sub>6</sub>H<sub>5</sub>-SO<sub>2</sub>-NH-(CH<sub>2</sub>)<sub>3</sub>-O-C<sub>2</sub>H<sub>5</sub>;  
 R<sub>32</sub>, R<sub>33</sub> = H, OH or NO<sub>2</sub>;  
 R<sub>34</sub> = 1-4 C (hydroxy)alkyl;  
 R<sub>35</sub>, R<sub>40</sub> = 1-4 C alkyl;  
 R<sub>36</sub> = CN;  
 R<sub>37</sub> = -(CH<sub>2</sub>)<sub>3</sub>-O-(CH<sub>2</sub>)<sub>2</sub>-O-C<sub>6</sub>H<sub>5</sub>;  
 R<sub>41</sub> = 1-4 C alkyl, optionally substituted by 1-4 C alkoxy;  
 R<sub>42</sub> = -COOCH<sub>2</sub>CH<sub>2</sub>OC<sub>6</sub>H<sub>5</sub>; and  
 R<sub>43</sub> = H; or  
 R<sub>42</sub> = H; and

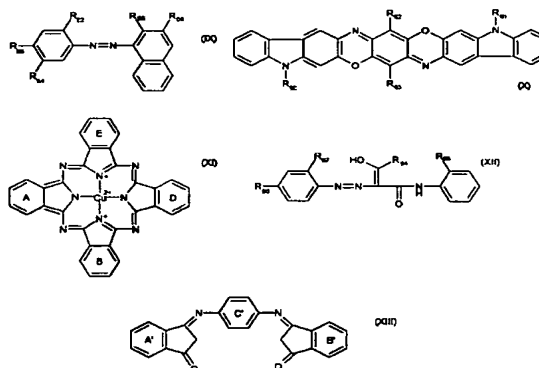
R<sub>43</sub> = -N=N-C<sub>6</sub>H<sub>5</sub>;  
 A, B = rings optionally mono- or poly-substituted by halogen;  
 R<sub>44</sub> = 1-4 C alkyl, optionally substituted by OH, 1-4 C alkoxy or 1-4 C alkoxy-(1-4 C)-alkoxy.  
 Especially suitable disperse dyes are (II);  
 R<sub>28</sub> = H or phenyl, optionally substituted by 1-4 C alkyl;  
 R<sub>29</sub> = H or amino, optionally substituted by 1-4 C alkyl; R<sub>31</sub> = H, 1-4 C alkyl or phenoxy;  
 R<sub>30</sub>, R<sub>32</sub>, R<sub>33</sub> = H  
 ); (IV);  
 R<sub>40</sub>, R<sub>41</sub> = 1-4 C alkyl;  
 R<sub>42</sub> = H, NO<sub>2</sub> or halogen;  
 R<sub>43</sub> = halogen);  
 and 3-hydroxy-2-(1,3-dioxo-indanylidene)-quinoline of formula (VIII);

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(VIII)

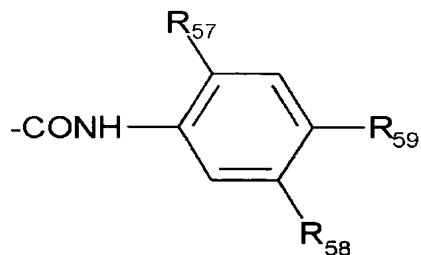
Preferred Pigment Dyes: The pigment is a 1-(phenylazo)-naphthalene (IX), carbazolo[3',2':5,6][1,4]oxazino[2,3-b]indolo[2,3-i]phenoxazine (X), copper phthalocyanine (XI), 1-arylo-azo-acetoacetanilide (XII) or 1,4-bis(3-oxo-indolinyl-azamethin)-benzene (XIII);



R<sub>56</sub> = hydrogen (H) or a group of formula (XIV);

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(XIV)

R<sub>52</sub>, R<sub>65</sub>, R<sub>67</sub> = H, halogen, 1-4 carbon (C) alkyl, 1-4 C alkoxy, nitro or cyano;

R<sub>53</sub>, R<sub>66</sub> = H, halogen, nitro or cyano;

R<sub>54</sub> = H, halogen or phenylaminocarbonyl;

R<sub>55</sub> = H or hydroxyl (OH);

R<sub>57</sub> = H, 1-4 C alkyl or 1-4 C alkoxy;

R<sub>58</sub> = H, 1-4 C alkoxy or halogen;

R<sub>59</sub> = H, 1-4 C alkyl, 1-4 C alkoxy or halogen;

R<sub>60</sub>, R<sub>61</sub> = 1-4 C alkyl;

R<sub>62</sub>, R<sub>63</sub> = halogen;

A, B, D, E, A', B' = rings optionally mono- or poly-substituted by halogen;

R<sub>64</sub> = 1-4 C alkyl.

Preferred Ink: The ink has a total dye content of 1-35, preferably 2.5-30, more preferably 5-20 wt.% and a viscosity of 2-5, preferably 10-30 mPa.s. Preferred Process: Drying and fixing or preferably printing, drying and fixing are carried out continuously.  
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